What is claimed is:

1   1. A data processing system including a plurality of data processing apparatuses,   at

2   least two of the data processing apparatuses being type 1 data processing apparatuses, a

3   type 1 data processing apparatus comprising:

4   at least one special-purpose data processing unit that includes a data path

5   portion for specialized data processing that is executed according to at least one

6   special-purpose instruction;

7   a general-purpose data processing unit for executing standard processing

8   according to general-purpose instructions; and

9   an instruction issuing unit for issuing instructions to the at least one special-

10   purpose data processing unit and the general-purpose data processing unit, based on a

11   program that includes the at least one special-purpose instruction and general-purpose

12   instructions,

13   wherein the general-purpose data processing unit of the type 1 data processing

14   apparatus includes communication means for exchanging data with the general-purpose

15   data processing unit in at least one other type 1 data processing apparatus.

1   2. A data processing system according to Claim 1,

2   wherein at least one of the at least one special-purpose data processing unit is

3   equipped with a function for exchanging data with a type 2 data processing apparatus.

1   3. A data processing system according to Claim 1,

2   wherein the type 1 data processing apparatuses are each equipped with a code

3   memory area for storing the program and a data memory area for inputting and/or

4   outputting data in accordance with at least one of the general-purpose instructions, and

5   when one of an input address for an input of data and an output address for an

6   output of data according to one of the general-purpose instructions is in a

7   predetermined address range, the communication means in a type 1 data processing

8   apparatus exchanges data by performing one of an input and an output of data for the

9   data memory area assigned to another type 1 data processing apparatus.

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1   4. A data processing system according to Claim 3,

2   wherein the communication means of the type 1 data processing apparatus is

3   equipped with transmission means for transmitting data to another type 1 data

4   processing apparatus when the output address is in a predetermined address range.

1   5. A data processing system according to Claim 3,

2   wherein the communication means of the type 1 data processing apparatus is

3   equipped with reception means for receiving data from another type 1 data processing

4   apparatus when the input address is a predetermined address range.

1   6. A data processing system according to Claim 3,

2   wherein the type 1 data processing apparatuses comprise at least one upper data

3   processing apparatus and at least one lower data processing apparatus that

4   communicates with the at least one upper data processing apparatus, and

5   the communication means of the lower data processing apparatus includes:

6   transmission means for transmitting data to the at least one upper data

7   processing apparatus when the output address is in a predetermined address range; and

8   reception means for receiving data from the at least one upper data processing

9   apparatus when the input address is in a predetermined address range.

1   7. A data processing system according to Claim 3,

2   wherein the type 1 data processing apparatuses comprise at least one upper data

3   processing apparatus and at least one lower data processing apparatus that

4   communicates with the at least one upper data processing apparatus, and

5   the communication means of the upper data processing apparatus includes:

6   transmission means for transmitting data to at least one lower data processing

7   apparatus when the output address is in a predetermined address range; and

8   reception means for receiving data from at least one lower data processing

9   apparatus when the input address is in a predetermined address range.

1   8. A data processing system according to Claim 3,

2   wherein the communication means of the type 1 data processing apparatus

3   includes means for storing, when data is received from another type 1 data processing

4   apparatus, the data at a corresponding address in the data memory area.

1   9. A data processing system according to Claim 8,

2   wherein the communication means of the type 1 data processing apparatus

3   further includes arbitration means for delaying an operation of the means for storing

4   data when the general-purpose data processing unit is presently reading data from a

5   dedicated reception region in the data memory area in which the means for storing data

6   is to store data, and for delaying an operation of the general-purpose data processing

7   unit that reads data from the dedicated reception region when the means for storing data

8   is presently storing data.

1   10. A data processing system according to Claim 3,

2   wherein the communication means of the type 1 data processing apparatus

3   includes means for supplying, when data is requested from another type 1 data

4   processing apparatus, the data from a corresponding address in the data memory area.

1   11. A data processing system according to Claim 10,

2   wherein the communication means of the type 1 data processing apparatus

3   further includes arbitration means for delaying an operation of the means for supplying

4   data when the general-purpose data processing unit is presently writing data into a

5   dedicated transmission region in the data memory area from which the means for

6   supplying data obtains data, and for delaying an operation of the general-purpose data

7   processing unit that writes data in the dedicated transmission region when the means

8   for supplying data is presently supplying data.

1   12. A data processing system according to Claim 1 further comprises a data processing

2   subsystem being composed of a plurality of special-purpose data processing units of a

3   plurality of type 1 data processing apparatuses for processing a single data stream.

1   13. A data processing system according to Claim 1 further comprises a plurality of data

2   processing subsystems, each data processing subsystem is composed of a plurality of

3   special-purpose data processing units of a plurality of type 1 data processing

4   apparatuses for processing a data stream.

1   14. A data processing apparatus, comprising:

2   at least one special-purpose data processing unit that includes a data path

3   portion for specialized data processing that is executed according to at least one

4   special-purpose instruction;

5   a general-purpose data processing unit for executing standard processing

6   according to general-purpose instructions; and

7   an instruction issuing unit for issuing instructions to the at least one special-

8   purpose data processing unit and the general-purpose data processing unit, based on a

9   program that includes the at least one special-purpose instruction and general-purpose

10 instructions,

11   wherein the general-purpose data processing unit includes communication

12 means for exchanging data with the general-purpose data processing unit in another

13 data processing apparatus.

1   15. A data processing apparatus according to Claim 14, further comprising:

2   a code memory area for storing the program; and

3   a data memory area for inputting and/or outputting data in accordance with at

4   least one of the general-purpose instructions,

5   wherein when one of an input address for an input of data and an output

6   address for an output of data according to the at least one of the general-purpose

7   instructions is in a predetermined address range, the communication means exchanges

8   data with another data processing apparatus by performing one of an input of data and

9   an output of data.

1   16. A data processing apparatus according to Claim 15,

2   wherein the communication means includes transmission means for

3   transmitting data to another data processing apparatus when the output address is in a

4   predetermined address range.

1   17. A data processing apparatus according to Claim 15,

2   wherein the communication means includes reception means for receiving data

3   from another data processing apparatus when the input address is in a predetermined

4   address range.

1   18. A data processing apparatus according to Claim 15,

2   wherein the communication means includes means for storing, when data is

3   received from another data processing apparatus, the data at a corresponding address in

4   the data memory area.

1   19. A data processing apparatus according to Claim 18,

2   wherein the communication means further includes arbitration means for

3   delaying an operation of the means for storing data when the general-purpose data

4   processing unit is presently reading data from a dedicated reception region in the data

5   memory area in which the means for storing data is to store data, and for delaying an

6   operation of the general-purpose data processing unit that reads data from the dedicated

7   reception region when the means for storing data is presently storing data.

1   20. A data processing apparatus according to Claim 15,

2   wherein the communication means includes means for supplying, when data

3   requested from another type 1 data processing apparatus, the data from a corresponding

4   address in the data memory area.

1   21. A data processing apparatus according to Claim 20,

2   wherein the communication means further includes arbitration means for

3   delaying an operation of the means for supplying data when the general-purpose data

4   processing unit is presently writing data into a dedicated transmission region in the data

5   memory area from which the means for supplying data obtains data, and for delaying

6   an operation of the general-purpose data processing unit that writes data in the

7   dedicated transmission region when the means for supplying data is presently

8   supplying data.

1   22. A method of control of a data processing apparatus equipped with (1) at least one

2   special-purpose data processing unit that includes a data path portion for specialized

3   data processing that is executed according to at least one special-purpose instruction,

4   (2) a general-purpose data processing unit for executing standard processing according

5   to general-purpose instructions, (3) an instruction issuing unit for issuing instructions to

6   the at least one special-purpose data processing unit and the general-purpose data

7   processing unit, based on a program that includes the at least one special-purpose

8   instruction and general-purpose instructions, (4) a code memory area for storing the

9   program, and (5) a data memory area for inputting and/or outputting data in accordance

10   with at least one general-purpose instructions,

11   the method comprising a communication step in which data is exchanged with

12   another data processing apparatus when, according to the at least one general-purpose

13   instructions, one of an input address for an input of data and an output address for an

14   output of data is in a predetermined address range.

1   23. A method of control according to Claim 22,

2   wherein the communication step includes a step for transmitting data to the

3   other data processing apparatus when the output address is in a predetermined address

4   range.

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1   24. A method of control according to Claim 22,

2   wherein the communication step includes a step for receiving data from the

3   other data processing apparatus when the input address is in a predetermined address

4   range.

1   25. A method of control according to Claim 22,

2   wherein the communication step includes a step for storing data that has been

3   received from the other data processing apparatus at a corresponding address in the data

4   memory area.

1   26. A method of control according to Claim 25,

2   wherein in the communication step, the step for storing data is delayed when

3   the general-purpose data processing unit is presently reading data from a dedicated

4   reception region and, when the step for storing data is presently being performed, an

5   operation of the general-purpose data processing unit that reads data from the dedicated

6   transmission region is delayed.

1   27. A method of control according to Claim 22,

2   wherein the communication step includes a step for supplying data that has

3   been requested by another type 1 data processing apparatus from a corresponding

4   address in the data memory area.

1   28. A method of control according to Claim 27,

2   wherein in the communication step, the step for supplying data is delayed when

3   the general-purpose data processing unit is presently writing data into a dedicated

4   transmission region and, when the step for supplying data is presently being performed,

5   an operation of the general-purpose data processing unit that writes data into the

6   dedicated transmission region is delayed.

1   29. A data processing system comprising:

2   a plurality of data processing apparatuses, at least two of the data processing

3   apparatuses being type 1 data processing apparatuses, a type 1 data processing

4   apparatus including at least one special-purpose data processing unit that includes a

5   data path portion for specialized data processing that is executed according to at least

6   one special-purpose instruction; a general-purpose data processing unit for executing

7   standard processing according to general-purpose instructions; and an instruction

8   issuing unit for issuing instructions to the at least one special-purpose data processing

9   unit and the general-purpose data processing unit, based on a program that includes the

10   at least one special-purpose instruction and general-purpose instructions;

11   wherein the general-purpose data processing unit of the type 1 data processing

12   apparatus includes a communication device for exchanging data with the general-

13   purpose data processing unit in at least one other type 1 data processing apparatus.